

In the Claims

Please cancel claims 1 – 12 and add new claims 13 – 24 as shown below.

Listing of Claims

1. – 12. (Cancelled)

13. (New) An image processing apparatus, comprising

a main processing unit that captures first image data by scanning substantially an entire area of one side of a negotiable instrument and converts the first image data to binary image data in accordance with one of at least first and second binarization methods, each of which is independent of the other and each of which involves a separate analysis of selected gray scale data; and

a pre-processing unit that captures second image data by scanning only a partial area of the one side of the negotiable instrument, the pre-processing unit having an evaluation section that evaluates the second image data and, based on the evaluation of the second image data, selects the binarization method to be executed by the main processing unit to convert the first image data to binary image data.

14. (New) An image processing apparatus as described in claim 13, wherein the partial area includes a text area containing magnetic ink characters printed on the negotiable instrument and one or more background areas containing a background pattern in at least a portion thereof.

15. (New) An image processing apparatus as described in claim 14, wherein said evaluation section comprises:

an edge pixel detection unit that detects edge pixels in the one or more background areas; and

a first selector that selects the binarization method based on a relative comparison of the number of detected edge pixels to a predetermined value.

16. (New) An image processing apparatus as described in claim 14, wherein the evaluation section selects the binarization method based on a threshold value calculation using a density distribution of pixels in a background of the text area and a density distribution of pixels in the one or more background areas.

17. (New) An image processing apparatus as described in claim 13, wherein the pre-processing unit further comprises:

a threshold value calculator that sets a threshold value for use in executing the selected binarization method, the threshold value for the first binarization method being derived from a density distribution of the second image data and the threshold value for the second binarization method being set at a predefined constant value, wherein the evaluation section selects the second binarization method if the threshold value calculated from the density distribution of the second image data exceeds a predetermined number or does not compute within a given range; and

a secondary binarization unit that sharpens the first image data by enhancing edge pixels of the first image data during execution of the second binarization method, if the threshold value is set at the predefined constant value.

18. (New) An image processing apparatus as described in claim 15, wherein the preprocessing unit further comprises:

a threshold value calculator that sets a threshold value for use in executing the selected binarization method, the threshold value for the first binarization method being derived from a density distribution of the second image data and the threshold value for the second binarization method being set at a predefined constant value;

a histogrammic generator that counts the number of pixels for each density value and computes the density distribution from the pixel count, wherein the evaluation section selects the second binarization method if the threshold value calculated from the density distribution computed by the histogrammic generator exceeds a predetermined number or does not compute within a given range; and

a secondary binarization unit that sharpens the first image data by enhancing edge pixels of the first image data during execution of the second binarization method, if the threshold value is set at the predefined constant value.

19. (New) An image processing method for a negotiable instrument, comprising the steps of:

(a) scanning substantially an entire area of one side of the negotiable instrument to capture an image thereof and an image of a partial area of the one side of the negotiable instrument;

(h) evaluating the captured image of the partial area;

(c) selecting a binarization method from at least first and second independent binarization methods based on the evaluation of step (b); and

(d) converting the image of substantially the entire area of the one side of the negotiable instrument to binary image data by applying the binarization method selected in step (c).

20. (New) An image processing method as described in claim 19, wherein the partial area includes a text area containing magnetic ink characters printed on the negotiable instrument and one or more background areas containing a background pattern in at least a portion thereof

21. (New) An image processing method as described in claim 20, further comprising the step of

(e) detecting edge pixels in the one or more background areas;

wherein the selection of the binarization method in step (c) is further based on the number of edge pixels detected in step (e).

22. (New) An image processing method as described in claim 20, wherein the selection of the binarization method in step (c) is further based on a density distribution of pixels in a background of the text area and a density distribution of pixels in the one or more background areas.

23. (New) An image processing method as described in claim 19, further comprising the step of.

(e) setting a threshold value for use in executing the selected binarization method, the threshold value for the first binarization method being derived from a density distribution of the captured image of the partial area and the threshold value for the second binarization method being set at a predefined constant value, wherein the second binarization method is selected in step (c) if the threshold value calculated from the density distribution of the captured image of the partial area exceeds a predetermined number or does not compute within a given range; and

(f) sharpening the captured image of the entire area by enhancing edge pixels thereof, if the second binarization method is selected in step (c), wherein, in step (d), the sharpened image of substantially the entire area of the one side of the negotiable instrument is converted to binary image data by applying the binarization method selected in step (c).

24. (New) A computer-readable medium carrying instructions for executing the steps of the image processing method of claim 19 to electronically process a negotiable instrument.